

IPW
4

PTO/SB/21 (09-04)

Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	10/714,673
Filing Date	December 19, 2003
First Named Inventor	Edward R. BEADLE
Art Unit	3662
Examiner Name	Dao L. Phan
Attorney Docket Number	HAR62 013

ENCLOSURES (Check all that apply)

<input checked="" type="checkbox"/> Fee Transmittal Form	<input type="checkbox"/> Drawing(s)	<input type="checkbox"/> After Allowance Communication to TC
<input type="checkbox"/> Fee Attached	<input type="checkbox"/> Licensing-related Papers	<input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences
<input type="checkbox"/> Amendment/Reply	<input type="checkbox"/> Petition	<input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
<input type="checkbox"/> After Final	<input type="checkbox"/> Petition to Convert to a Provisional Application	<input type="checkbox"/> Proprietary Information
<input type="checkbox"/> Affidavits/declaration(s)	<input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address	<input type="checkbox"/> Status Letter
<input type="checkbox"/> Extension of Time Request	<input type="checkbox"/> Terminal Disclaimer	<input type="checkbox"/> Other Enclosure(s) (please identify below):
<input type="checkbox"/> Express Abandonment Request	<input type="checkbox"/> Request for Refund	
<input checked="" type="checkbox"/> Information Disclosure Statement	<input type="checkbox"/> CD, Number of CD(s) _____	
	<input type="checkbox"/> Landscape Table on CD	
<input type="checkbox"/> Certified Copy of Priority Document(s)	Remarks	
<input type="checkbox"/> Reply to Missing Parts/Incomplete Application	The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 04-1679	
<input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Duane Morris LLP		
Signature			
Printed name	Ryan T. Hardee		
Date	February 8, 2006	Reg. No.	57,515

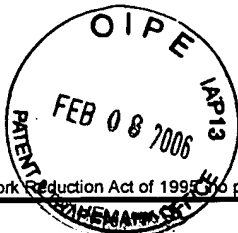
CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



PTO/SB/17 (01-06)

Approved for use through 07/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL

For FY 2006

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 180.00

Complete if Known

Application Number	10/714,673
Filing Date	December 19, 2003
First Named Inventor	Edward R. BEADLE
Examiner Name	Dao L. Phan
Art Unit	3662
Attorney Docket No.	HAR62 013

METHOD OF PAYMENT (check all that apply)☒ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____☐ Deposit Account Deposit Account Number: _____ Deposit Account Name: _____

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below☐ Charge fee(s) indicated below, **except for the filing fee**☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17☐ Credit any overpayments**WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**FEE CALCULATION** (All the fees below are due upon filing or may be subject to a surcharge.)**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES**Fee Description**

Each claim over 20 (including Reissues)

Fee (\$)	Small Entity Fee (\$)
50	25

Each independent claim over 3 (including Reissues)

200	100
-----	-----

Multiple dependent claims

360	180
-----	-----

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
--------------	--------------	----------	---------------

_____ - 20 or HP = _____ x _____ = _____

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
---------------	--------------	----------	---------------

_____ - 3 or HP = _____ x _____ = _____

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
--------------	--------------	--	----------	---------------

_____ - 100 = _____ / 50 = _____ (round up to a whole number) x _____ = _____

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Fees Paid (\$)Other (e.g., late filing surcharge): Information Disclosure Statement\$180.00**SUBMITTED BY**

Signature		Registration No. 57,515 (Attorney/Agent)	Telephone 202.776.7800
Name (Print/Type)	Ryan T. Hardee		Date February 8, 2006

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



ATTORNEY DOCKET NO. HAR62 013

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Patent Application of Edward R. Beadle, et al.

Serial No.: 10/714,673

Art Unit: 3662

Filed: December 19, 2003

Examiner: Dao L. Phan

Title: SYSTEM AND METHOD FOR CUMULANT-BASED GEOLOCATION OF
COOPERATIVE AND NON-COOPERATIVE RF TRANSMITTERS

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Copies of the below listed documents are enclosed for consideration in the
examination of the subject application.

U.S. PATENTS AND PATENT APPLICATIONS:

<u>Patent No.</u>	<u>Patentee(s)</u>	<u>Issue Date</u>	<u>Examiner Initials</u>
6,845,164	Gustafsson	January 18, 2005	
6,711,528	Dishman, et al.	March 23, 2004	
6,535,666	Dogan et al.	March 18, 2003	
6,449,560	Kimball	September 10, 2002	
6,426,977	Lee et al.	July 30, 2002	
6,252,962	Sagey	June 26, 2001	

6,208,295	Doğan et al.	March 27, 2001
6,185,309	Attias	February 6, 2001
5,996,406	Ward	December 7, 1999
5,959,966	Torkkola	September 28, 1999
5,909,646	Deville	June 1, 1999
5,893,031	Hoogerwerf, et al.	April 6, 1999
5,848,160	Cai et al.	December 8, 1998
5,706,402	Bell	January 6, 1998
5,640,419	Janusas	June 17, 1997
5,651,030	Wong, et al.	July 22 1997
5,539,832	Weinstein et al.	July 23, 1996
5,459,668	Dogan et al.	October 17, 1995
5,381,450	Lane	January 10 1995
5,283,813	Shalvi et al.	February 1, 1994
4,965,732	Roy, III et al.	October 23, 1990
4,607,305	Milo	August 19, 1986
4,506,225	Loveless, et al.	March 19, 1985
4,166,980	Apostolos, et al.	September 4, 1979
20020153891	Smith et al.	October 24, 2002

FOREIGN PATENTS:

<u>Patent No.</u>	<u>Patentee(s)</u>	<u>Issue Date</u>	<u>Examiner Initials</u>
FR2713799	Alcatel Alsthom CIE Gen Elec.	June 16, 1995	

Relevance of Foreign Language Documents

1. FR2713799 – An English language abstract is provided for the listed reference.

OTHER PUBLICATIONS:

Agee, B.G., "The Property Restoral Approach to Blind Adaptive Signal Extraction," Ph.D. Dissertation, Department of Electrical Engineering and Computer Science, University of California, Davis, 1989.

Abed-Meraim, K., Y. Xiang, J.H. Manton, and Y. Hua, "Blind Source Separation Using Second-Order Cyclostationary Statistics," IEEE Transactions on Signal Processing, Vol. 49, No. 4, April 2001, pp. 694-701.

Bai, Z., J. Demmel, J. Dongarra, A. Ruhe, and H. van der Vorst, Templates for the Solution of Algebraic Eigenvalue Problems: A Practical Guide. SIAM, Philadelphia, PA: 2000.

Bell, A.J. and T.J. Sejnowski, "An Information-Maximization Approach to Blind Source Separation and Blind Deconvolution," Neural Computing, Vol. 7, 1995, pp. 1129-1159.

Belouchrani, A., K. Abed-Meraim, J.F. Cardoso, and E. Moulines, "Blind Source Separation Using Second-Order Statistics," IEEE Transactions on Signal Processing, Vol. 45, No. 2, February 1997, pp. 434-444.

Biglieri, E., J. Proakis, and S. Shamai, "Fading Channels: Information-Theoretic and Communications Aspects," IEEE Transactions on Information Theory, Vol. 44, No. 6, October 1998, pp. 2619-2691.

Cardoso, J.F., "Blind Signal Separation: Statistical Principles," Proceedings of the IEEE, Vol. 9, No. 10, October 1998, pp. 2009-2025.

Cardoso, J.F. and A. Souloumiac, "Blind Beamforming for Non-Gaussian Signals," IEEE Proceedings F, Vol. 140, No. 6, December 1993, pp. 362-370.

Cardoso, J.F. and B. Hvam Laheld, "Equivariance Adaptive Source Separation," IEEE Transactions on Signal Processing, Vol. 44, No. 12, December 1996, pp. 3017-3030.

Castedo, L. and A.R. Figueiras-Vidal, "An Adaptive Beamforming Technique Based on Cyclostationary Signal Properties," IEEE Transactions on Signal Processing, Vol. 43, No. 7, July 1995, pp. 1637-1650.

Chang C., Z. Ding, S.F. Yau, and F.H.Y. Chan, "A Matrix-Pencil Approach to Blind Separation of Non-White Sources in White Noise," Proc. ICASSP98, Vol. IV, pp. 2485-2488.

Chang, C., Z. Ding, S.F. Yau, and F.H.Y. Chan, "A Matrix-Pencil Approach to Blind Separation of Colored Non-Stationary Signals," IEEE Transactions on Signal Processing, Vol. 48, No. 3, March 2000, pp. 900-907.

Chiang, H.H. and C.L. Nikias, "The ESPRIT Algorithm with Higher-Order Statistics," Proceedings Workshop on Higher-Order Spectral Analysis, Vail, Colorado, June 1989, pp. 163-168.

Choi, S. and A. Cichocki, "Blind Separation of Non-stationary and Temporally Correlated Sources from Noisy Mixtures," Neural Networks for Signal Processing X, 2000. Proceedings of the 2000 IEEE Signal Processing Society Workshop, Vol. 1, December 2000, pp. 405-414.

Comon, P., "Independent Component Analysis, A New Concept?," Signal Processing, Vol. 36, No. 3, April 1994, pp. 287-314.

Ding, Z., "A New Algorithm for Automatic Beamforming," Proceedings of the 25th Asilomar Conference of Signals, Systems, and Computers, Vol. 2, 1991, pp. 689-693.

Ding, Z. and T. Nguyen, "Stationary Points of Kurtosis Maximization Algorithm for Blind Signal Separation and Antenna Beamforming," IEEE Transactions on Signal Processing, Vol. 48, No. 6, June 2000, pp. 1587-1596.

Dogan, M.C. and J.M. Mendel, "Applications of Cumulants to Array Processing – Part I: Aperture Extension and Array Calibration," IEEE Transactions on Signal Processing, Vol. 43, No. 5, May 1995, pp. 1200-1216.

Dwyer, R.F., "Classification of Very Wide Bandwidth Acoustic Signals," Oceans 1997, MTS/IEEE Conference Proceedings, Vol. 1, pp. 496-9, Oct. 6-9, 1997.

Gabriel, W.F., "Adaptive Processing Array Systems," Proceedings of the IEEE, Vol. 80, No. 1, January 1992, pp. 152-162.

Gantmacher, F.R., The Theory of Matrices, Volume I. AMS Chelsea Publishing, Providence, RI: 1977.

Gantmacher, F.R., The Theory of Matrices, Volume II. AMS Chelsea Publishing, Providence, RI: 1989.

Godard, D.N., "Self-recovering Equalization and Carrier Tracking in Two-dimensional Data Communication Systems," IEEE Transactions on Communications, Vol. COMM-28, November 1980, pp. 1867-1875.

Golub, G.H. and C.F. Van Loan, Matrix Computations. The Johns Hopkins University Press, Baltimore, MD: 1996.

Haardt, M., et al., "Improved Bearing and Range Estimation via High-Order Subspace Based Unitary ESPRIT," Signals, Systems and Computers, Vol. 1, pp. 380-4, Nov. 3-6, 1996.

Halmos, P.R. Finite-Dimensional Vector Spaces. Springer-Verlag, New York, NY: 1987.

Harville, D.A., Matrix Algebra from a Statistician's Perspective. Springer-Verlag, New York, NY: 1999.

Hayes, M.H., Statistical Digital Signal Processing and Modeling. John Wiley and Sons, New York, NY: 1996.

Haykin, S., Adaptive Filter Theory. PTR Prentice-Hall, Upper Saddle River, NJ: 1996.

Hyvärinen, A., "Survey on Independent Component Analysis," Neural Computing Surveys, Vol. 2, No. 1, 1999, pp. 94-128.

Inouye, Y., "Cumulant-Based Blind Identification of Linear Multi-Input-Multi-Output Systems Driven by Colored Inputs," IEEE Transactions on Signal Processing, Vol. 45, No.6, June 1997.

Johnson, D.H. and D.E. Dudgeon, Array Signal Processing: Concepts and Techniques. PTR Prentice-Hall, Englewood Cliffs, NJ: 1993.

Jütten, C. and J. Herault, "Blind Separation of Sources, Part I: An Adaptive Algorithm Based on Neuromimetic Architectures," Signal Processing, Vol. 24, 1991, pp. 1-10.

Kanatani, K., Statistical Optimization for Geometric Computation: Theory and Practice. Elsevier Science B.V., Amsterdam, The Netherlands: 1996.

Kohno, R., "Spatial and Temporal Communication Theory Using Adaptive Antenna Array," IEEE Personal Communication, Vol. 5, No. 1, February 1998, pp. 28-35.

Krim, H. and M. Viberg, "Two Decades of Array Signal Processing Research," IEEE Signal Processing Magazine, July 1996, pp. 67-94.

Marchand, P. and J-L Locoume, "Multiple Hypothesis Modulation Classification Based on Cyclic Cumulants of Different Orders," 0-7803-4428-6/98 IEEE, pp. 2157-2160.

Markus, A.S., Introduction to the Spectral Theory of Polynomial Operator Pencils, Translation of Mathematical Monographs, Vol. 71. American Mathematical Society, Providence, RI: 1988.

Martin, G.P., "Polarization Based Steering Vector Determination," Harris Corporation Internal Technical Memorandum, January 1989.

Nandi, A.K., Blind Estimation Using Higher-Order Statistics. Kluwer Academic, Dordrecht, The Netherlands: 1999.

Nikias, C.L. and J.M. Mendel, "Signal Processing with Higher-Order Spectra," IEEE Signal Processing Magazine, Vol. 10, No. 3, July 1993, pp. 10-37.

Nikias, C.L. and A.P. Petropulu, Higher-Order Spectra Analysis: A Non-Linear Signal Processing Framework. PTR Prentice-Hall, Upper Saddle River, NJ: 1993.

Papoulis, A., Probability, Random Variables, and Stochastic Processes. WCB/McGraw-Hill, Boston, MA: 1991.

Rosenblatt, M., Stationary Sequences and Random Fields. Birkhauser, Boston, MA: 1985.

Roy, R., A. Paulraj, T. Kailath, "Direction-of-Arrival Estimation by Subspace Rotation Methods," Proc. ICASSP86, pp. 2495-2498.

Roy, R. and T. Kailath, "ESPRIT-Estimation of Signal Parameters via Rotational Invariance Techniques," IEEE Transactions on ASSP, Vol. 37, No. 7, July 1989, pp. 984-995.

Schmidt, R.O., "Multiple Emitter Location and Signal Parameter Estimation," IEEE Transactions on Antennas and Propagation, Vol. AP-34, No. 3, March 1986, pp. 276-280.

Schott, J.R., Matrix Analysis for Statistics. John Wiley and Sons, New York, NY: 1997.

Strang, G. Introduction to Linear Algebra. Wellesley-Cambridge Press, Wellesley, MA: 1998.

Swami, A. and B.M. Sadler, "Hierarchical Digital Modulation Classification Using Cumulants," IEEE Transactions on Communications, Vol. 48, No. 3, March 2000, pp. 416-429.

Tong, L., G. Xu, and T. Kailath, "Blind Identification and Equalization Based on Second-Order Statistics: A Time-Domain Approach," IEEE Transactions on Information Theory, Vol. 40, No. 2, March 1994, pp. 340-349.

van der Veen, A.J., S. Talwar, and A. Paulraj, "A Subspace Approach to Blind Space-Time Signal Processing for Wireless Communication Systems," IEEE Transactions on Signal Processing, Vol. 45, no. 1, January 1997, pp. 173-190.

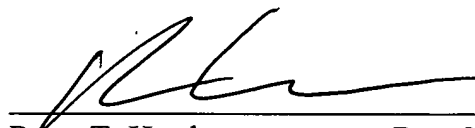
Van Dooren, P., "Reducing Subspaces: Definitions, Properties, and Algorithms," Matrix Pencils, Proceedings Pite Havsbad, Lecture Notes in Mathematics 973, Springer-Verlag, New York, NY, 1982, pp. 58-73.

Van Veen, B.D. and K.M. Buckley, "Beamforming: A Versatile Approach to Spatial Filtering," IEEE ASSP Magazine, April 1988, pp. 4-24.

Widrow, B. and S.D. Stearn, Adaptive Signal Processing. PTR Prentice-Hall, Upper Saddle River, NJ: 1985.

Yuen, N. and B. Friedlander, "Asymptotic Performance Analysis of ESPRIT, Higher-order ESPRIT, and Virtual ESPRIT Algorithms," IEEE Transactions on Signal Processing, Vol. 44, No. 10, October 1996, pp. 2537-2550.

Respectfully Submitted,



Ryan T. Hardee	Reg. No. 57,515
Mark C. Comtois	Reg. No. 46,285
Patrick D. McPherson	Reg. No. 46,255
D. Joseph English	Reg. No. 42,514

DUANE MORRIS LLP
1667 K Street, N.W., Suite 700
Washington, D.C. 20006
Telephone: (202) 776-7800
Telecopier: (202) 776-7801

Dated: February 8, 2006